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NEW YORK, SATURDAY, FEBRUARY 4, 1865.

Contents;

(Illustrations are indicated by an asterisk.)

AMENDMENT TO THE PATENT LAWS.—IMPORTANT TO PATENTEES.

The editorial letter from Washington published in our last number refers to an amendment now pending before Congress, designed to relieve a very large number of inventors who have failed to pay the balance of the patent fee—twenty dollars—within the six months as provided by law, thereby forfeiting their rights.

The language of the act of March 3, 1863, which requires payment of the balance fee within the six months after date of allowance, is peculiar. It provides that in default of said payment the invention shall become *public property as against the applicant*. The public acquire no rights in the invention as against another and subsequent inventor, leaving the original and first applicant only to suffer the consequences of not having paid the second fee within the time specified.

The rule of the Patent Office treats all such lapsed patents as judicially dead upon the record, and examiners are not allowed to refer to them under any circumstances, even though an application be made by another inventor for the same thing. Though this rule may be correct as based upon the language of the law of March 3, 1863, it nevertheless contravenes the plain intention of the statute of 1836, which requires that patents can issue only to the original and first inventor of the art, machine, composition or improvement. The same statute provides that whenever, in the Commissioner's opinion, two pending applications are adjudged to interfere with each other, that officer shall declare an interference, and require testimony with a view to determine the question of priority as between the applicants.

The amendment of 1863, however, conflicts with the law of 1836, inasmuch as it shuts off from this interference the unfortunate first applicant who has not paid up within the six months. Many might hastily jump at the conclusion that it would be serving an inventor right who thus failed to comply with the inexorable demands of the law; but we think no unprejudiced mind will thus reason, when a fair statement of the case is presented.

If an inventor wilfully neglect his duty as prescribed by the law, he is entitled to no sympathy, and ought not to ask for it; but the records of the Patent Office show most conclusively that there are hundreds of cases in which the applicant could not comply with the law. Many inventors justly plead inability to make the payment in time; some are entircly ignorant of the law on the subject, and for want of such information do not pay up in time; but it bears with peculiar hardship upon persons residing in foreign countries and upon those who are engaged in the military and naval service of the country. Inventors of this class are subject to all the changes and vicissitudes of the service, and are rarely ever stationed for a long time in one position.

There are many very aggravating cases, involving the interests of our brave soldiers, which appeal with great force for such relief as will be afforded to them by the bill now pending before Congress.

The act in question provides that an applicant whose patent has elapsed under the operation of the law of March 3, 1863, shall have a right to renew his application within two years after date of allowance, upon the payment of fifteen dollars, and to use the papers and model originally presented to the Patent Office. This we regard as a fair and equitable treatment of all such cases, and we trust that it will meet the approbation of Congress.

The bill has been carefully considered in all its bearings, and has received the unqualified sanction of the Hon. Commissioner of Patents. It now only awaits the action of Congress to become a law of relief. It is vastly important, however, that it should pass at this session in order to allow all such cases to be included within its provisions. If it be put over till the next Congress the term of two years, as provided in the bill for the renewal of applications, will have expired before favorable action can be had.

Inventors who are suffering under the operation of this law of limitation ought to write to their members of Congress to look after the bill, and not allow it to slumber for want of attention.

ARE BANK DEPOSITS CURRENCY?

Hunt's Merchants' Magazine, under its new management, exhibits a mastery of economic science which gives remarkable interest and force to its discussion of financial questions. In the last number is an article on The National Finances, by Hon. Amasa Walker, the several positions of which seem to us sound, with one exception. This is embraced in the sentence, "The bank currency of the nation, at the present time, reckoning the circulation at $250,000,000, and the deposits at $450,000,000, is $700,000,000."

The currency or money of this country at the present time is of two kinds. In the States lying on the Pacific it consists of flat disks of two metals, gold and silver. In the remainder of the country it is a mixture of metallic disks and notes, the metal being an alloy of copper and nickel, and the notes being partly those of the United States Government, and partly those of certain joint stock companies or associations of individuals, called banks. The managers of these companies have succeeded in so establishing their credit, that their notes are received by people in exchange for the most valuable property, and have finally come into use as money. This same credit induces people who have money on hand which they do not intend to use immediately, to leave it with some bank for safe-keeping. If the banks kept these deposits on hand in the form of money, it would be a portion of the currency of the country; but this is not the case.

Deposits are usually made with banks in the first instance in the form of notes. One trader sells to another $1,000 worth of merchandise on six months credit, the purchaser giving his note for the amount. The seller sends his note to the bank for discount; the interest is deducted, and the remainder is carried to the trader's credit as a deposit.

If the trader now buys goods for cash, he draws his check for the amount; the seller of these goods sends the check to his bank, where it is entered to his credit as a deposit, and after its passage through the clearing house it is charged to the drawer, diminishing his deposits to the same extent. This is the ordinary course of business.

It will be seen that bank deposits are simply ledger balances, being the records of the transfer and ownership of merchandise. There is no more propriety in calling them currency, than there is in calling a barrel of pork, currency.

If a bank has on hand any notes of other banks, thore notes are money, or currency. But they are part of the circulation, and are included in the $250,000,000.

CORN HUSK FOR PAPER STOCK.

We are informed that the process for making paper from corn husks, of which so much has been said in the SCIENTIFIC AMERICAN, is about to be tried here on an extensive scale in a short time. If successful, printing paper especially is to be largely manufactured.

Corn husks have doubtless been fed out to cattle universally this winter, but expensive as hay is it is questionable economy to do so now when there is a prospect of obtaining a high price for the husks before spring. We therefore suggest that our agricultural readers carefully husband their stock of this staple, for a time at least, as the demand for it is likely to make it much more valuable than it is in the shape of cattle feed.

We sincerely hope and believe that the preliminary trials with corn husks for paper stock will prove to be what it has been represented, and further, that energetic measures will be taken to put the manufacture in market, for newspaper publishers have no heavier tax in their business than the price of printing paper.

It is stated that proprietors of the leading papers in this city have secured the right to make paper from this substance, and farmers are requested to address D. A. Craig, General Agent of the Associated Press, New York City, in reference to any quantity of corn husks they may have to dispose of.

HOT BEARINGS.

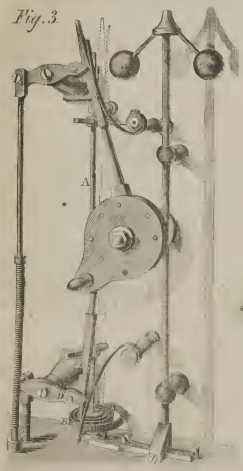
Detention and delay of steam vessels by hot bearings is not an uncommon occurrence. We read in reports of trial trips "the ship was delayed some hours by hot bearings." These few words convey no idea to the nnniniated, of the engineer's anxiety, the impatience of the captain and sailing officers on such occasions. There are some screw steamers out of this port which have an inch and a half stream of water constantly running on the main shaft-bearing. Such nastiness as this creates is beyond expression. Those who go below in the performance of their duties are agreeably (!) surprised by warm jets of greasy spray, and besmeared from head to foot. The bilge pumps are forever going, or the bilge injection is kept wide open to free the ship from the water. No lubrication takes place, for the oil is washed out as fast as it is poured in, and the main bearing has little more oil than the stern bearing, which runs under water.

Aside from faults of design which are often the sole cause, there are others which relate to mere manipulation or adjustment which may be here alluded to. Bearings often heat from being what is technically called "collar bound," or so tight sidewise that there is no motion.

Paddle wheel steamers rolling in a sea-way invariably heat and cut at the collars when the brasses are tighter at the point designated. When cutting once begins the fine metal abraded gets in and tears up the whole surface, rendering it hot in a short time. Badly fitted boxes also heat quickly. There will always be one part of the bearing where the chief work is done. A horizontal engine bearing wears chiefly at the sides, and chocks are provided for the purpose of taking the brasses up at these points. Vertical engine bearings wear at the bottom and top, and the labor is always in the direction of the stroke of the piston. Thus the brasses and bearings are continually wearing oval, or out of rotundity, and have to be chipped off to bring them down. When heating is not caused by defective adjustment, and is simply a fault of design, it is often of advantage to "doctor" the lubricant, and for this purpose blacklead and oil are useful. Sulphur and oil are also employed, and many engineers advocate the use of soapstone finely pulverized. Blacklead and tallow is also used for heavy bearings. All of these mixtures are nasty, and are chiefly valuable for their heavy body. Sulphur possesses no refrigerating power on a hot shaft, whatever it may do to the human body Blacklead has a certain smoothness which is valuable, and there is virtue in tallow. There is still an-

pulley or break, the regulator balls drop down far enough to trip a lever (not shown) by means of an inclined sliding piece made to work in or out of the way, as occasion may require. This action liberates a ratchet gear on the end of the upright shaft, A, thereby causing the shaft to turn round by means of a spring, B, far enough to throw back the hooks, C, from the pins, D. These hooks operate the main

Fig. 3.



spring attached to draw up the back end of the trip lever, B, far enough to depress the shoes, C, from their catches. The springs are so fixed in every case as not to affect the free action of the governor.

FIGURE 6.

This arrangement is applicable to engines of the Green patent, but may be applied to others of various kinds. In the case of the Green engine, if the governor belt breaks or slips, the shaft moves up far enough to throw out the lever, A, from its groove, B (see section), thus liberating the shaft, which is thrown down by means of a spring, C, far enough to depress the tappets, so they will pass by the catches. Some springs are made so as to be inside of the coup-

Fig. 4.

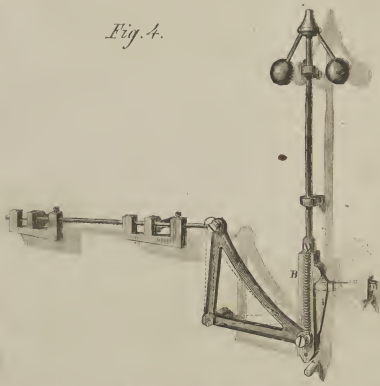
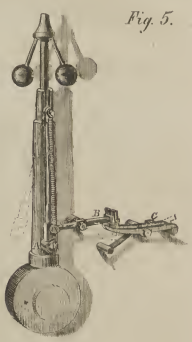


Fig. 5.



applied, in no way interferes with the free action of the regulator, and a wire may, in all cases, be attached to the stop motion so as to stop the engine from any room or from a distance of several blocks of buildings.

Applications for patents are now pending on the several plans above illustrated which are not specified as being already patented. For further particulars address the Automatic Stop-motion Company, Newburyport, Mass.

HOW TO DETECT COUNTERFEITS.

We have received from the authors, Messrs. E. J. Wilber and E. P. Eastman, of the Commercial Col-

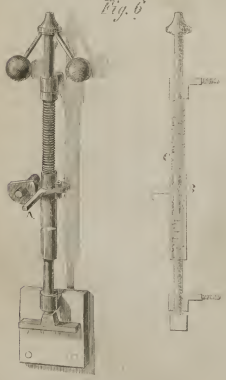
AUTOMATIC STOP-MOTION FOR STEAM ENGINES.

valves which, of course, cease moving when the two are disconnected.

FIGURE 4.

This arrangement is applicable to a double engine. In case the regulator belt should break or slip on its

Fig. 6.



pulley, the balls would drop down far enough to liberate the straight or bent arm, A, thereby causing a pin in the slotted coupling to be released and drawn up by means of the spring, B, throwing the inclines far back enough to depress the hooks from their catches, thus stopping the engines.

FIGURE 5.

When the regulator, from any cause, drops down, the hook, whose lower end is an incline, strikes upon a cam, A—which may be turned up or down at pleasure—and is thrown off from its pin, thus enabling a

ling, being much more slightly in this way than where they are on the exterior.

FIGURE 7.

This is a straight or bent lever, A, terminating in a ball, B, both attached to a shoe, C, with a regulating screw, D, for adjusting the position of the lever, A, so that it may be set at any required angle. In case of an increase of speed this ball will be thrown over far enough to trip the shoe off, as shown by

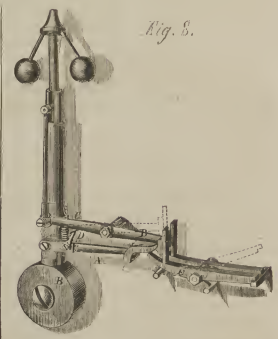
Fig. 7.

dotted lines. On the Green engine it may be attached to the sliding bar for the purpose of depressing the tappets so that they may pass without catching. This is entirely independent of the regulator.

FIGURE 8

This arrangement is a forked lever, A, one end or which is attached to the regulator stand, B, the other end is supported by a spiral spring, C. The forked lever, A, is put in operation by the trip lever, B, by means of the button or arm, D, which may be turned up or down. When the regulator drops down it depresses the forked lever far enough to liberate the shoes, E, from the catches. The invention, however

Fig. 8.



lege, Poughkeepsie, N. Y., a copy of their treatise on counterfeit bank notes. It is an elegant little volume of 50 pages, gilt edged, handsomely bound in red cloth, and illustrated with a large number of fine copper and steel plate engravings made by the New York Bank Note Company. The several parts of a bank note are minutely described, and the differences between the genuine and the counterfeit are fully pointed out. As a sample of this work we extract what is said in relation to portraits:—

"In no department of the counterfeiter's art has he met with more signal failure than in attempting to delineate the 'human face divine,' which, as one has beautifully and truthfully observed, 'is the painted stage and natural robing-room of the soul.'

'GENUINE.—In the true bill, the mouth, eyes and face have an expression clear and distinct.

"The hair, even in its most delicate wavings and strands, is accurately copied. The hands, and especially the fingers, will be found proportioned to the

figure. The texture of the skin has not escaped attention, and indeed, in every respect, to the very minutiæ of detail, the portrait will bear close scrutiny.

"The more familiar portraits, as those of Washington, Franklin, Clay and Webster, 'the old familiar faces,' will strike the eye at once as being accurate, and the longer and more critically observed, the more perfect will the resemblance appear.

"COUNTERFEIT.—In the counterfeit, the eye will be found not unfrequently without a pupil; the delicate lines about the mouth omitted or constrained so as to give a rigid and unnatural expression to that very important feature of the face; black lines encircle the head, spots and broken lines appear on the cheek and neck, none of which are seen on genuine notes. Bank-notes may be so nearly worn out, it is true, as to make it no easy task to trace and follow out the symmetry and fineness of all parts of the portrait; but if any portion of the portrait is left entire, our remarks will be found applicable to that portion."

Price of the work two dollars.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Stills for Petroleum and other Liquids.—This invention is the subject of three patents. The first is for making a combustion chamber in the furnace of stills, which rises upward within the retort, and thereby heats the body of the charge in the retort within, while the charge is also exposed to heat on the outside of the retort. The second is for surrounding the retort of a still outside of the flue space with a jacket of non-conducting material to prevent the loss of heat; also in the use of steam for cleaning the retort from residuum or sediment which may collect on its bottom; also in a peculiar construction of furnace by which air is supplied to and mixed with gas before they issue from the fire surface of the furnace. The third patent is for placing a movable furnace below a still, so that the heat can be regulated; also in the construction of a hollow furnace for using gas and air combined, and which are mixed in the furnace itself, and delivered through holes in the top plate of the furnace. G. H. S. Duffus, of New Orleans, La., is the inventor.

Pump.—This invention consists in an oscillating vacuum pump whose valve is opened by means of the contact of the valve stem with an inclined plane below it, and closed by a spring. The joint of the valve stem is packed by means of an elastic ring, and the hollow journal which connects the cylinder with the receiver is also packed by a like ring. A. S. Lyman, of New York City, is the inventor.

Safeguard for Protecting Pottery Ware.—Pottery ware, during the process of burning or baking, requires to be protected from cinders, smoke and other substances which are liable to come in contact with it and impair its value. At present the articles or ware are placed within a cylinder made of fire clay, and provided with a close bottom, the articles being placed one over the other, and prevented from being in contact by means of rods or pins. The cylinders are made of various sizes, according to the size of the articles they are to receive, and are placed one over the other in the furnace, in rows or tiers. These cylinders, commonly termed safeguards or saggers, are attended with some disadvantages. In the first place it is rather difficult to adjust the articles in and remove them from the cylinders, and considerable room or space is lost by them, and the top article in each cylinder liable to be injured by fragments dropping from the bottom of the cylinder immediately above. These difficulties are fully obviated by this invention, which consists in forming the cylinders of a series of rings, provided with a flange or annular lip at their lower edges, and with a corresponding recess in their upper edges, so that one ring may be fitted over the other, a vessel or article to be burned or baked being fitted in each ring, and resting on pins thereon. Benjamin Jackson, Trenton, N. J., is the inventor.

Steam Boiler.—This invention relates to a new and improved application of a float to steam boilers, for the purpose of indicating the hight of the water therein, sounding an alarm when the water is below a certain level, and also, if necessary or desired, be made the means for putting in operation a pump to supply the boiler. The objection to the use of floats in steam boilers to indicate the hight of the water has been that they are frequently affected by the foam so as to be very unreliable, and further that the gage rod attached to the float and passing through a stuffing box or guides is so restricted in its free movement by friction as to render the action of the float very uncertain. This invention is designed to obviate these difficulties, and to this end it consists in isolating the float from the mass or bulk of water in the boiler and still have the float expand to the same influences of buoyancy and steam pressure as when in the boiler, whereby the float is rendered reliable by being placed beyond the action of foam. The invention consists further in connecting the float rod with a lever at the exterior of the boiler in such a manner as to avoid all inaccuracies due from friction, and at the same time form a perfect water-tight joint, where the rods, which form a connection between the float rod and the lever, pass through the casing or box in which the float rod is fitted or works. Joseph Yates, of Mott Haven, N. Y., is the inventor.

Portable Lantern.—This invention consists in combining a socket or spring to receive a candle, with a case having a glass front, and in such a manner that the tube may be shoved entirely within the case when the lantern is not required for use, and also adjusted so that the tube may serve as a handle when the lantern is in use and a handle is required. The case of the lantern is provided with a cover, which closes over the glass part and protects it when the lantern is not in use, and is capable of being raised to serve as a reflector when the lantern is in use. The invention is more especially designed for army or camp purposes, but it will prove a convenient device for general use, it being durable, and the case constructed in such a manner that no solder is required, which frequently melts under the heat of the flame, and causes the parts to become detached. Charles Deavs, assignor to Archer & Pancoast, of 9 Mercer street, New York City, is the inventor.

Folding Chair, Table, Etc.—This invention consists in a folding chair, table or other similar article, the seat or top of which is made of canvas or other flexible material, and supported by a series of radiating arms, which are hinged to a central hub, secured to the upper end of a longitudinally-sliding staff, in combination with hinged braces, connected to the radiating arms, and made to radiate from a sleeve through which the staff slides, and which is supported by hinged legs connecting by means of toggle arms with a ring fitted on the lower end of the central staff in such a manner that by expanding the legs and depressing the central staff the seat or top is expanded and rendered rigid, and at the same time the toggle arms assume such a position they retain the legs and prevent them from collapsing accidentally; but by slightly raising the center staff the toggle arms are brought in such a position that the chair, table or other article can be folded up with the greatest convenience and in a small compass. If desired, the legs and seat or top may be disconnected and each folded or expanded separately. Ferdinand Ludke, 287½ Bowery, New York, is the inventor.

Improvement in Mirrors.—We have lately examined some most beautiful specimens of mirrors prepared by a new process for which a patent has just been granted to Louis Paul Angenard, of New York city. The reflecting compound is made in the following manner:—Dissolve two-thirds of an ounce of platinum, by means of heat, in two and a half ounces of muriatic acid and one and one-sixteenth ounces of nitric acid. Evaporate the acids; then pulverize the mass, reduce with alcohol, and apply the solution with a brush to the glass surface. The glass is then heated in an oven till it reaches the cherry-red color, when it is allowed to cool and the operation is finished. The whole process is exceedingly simple, quick and economical, and the resulting mirrors are of superior quality. The adhesive properties of the compound are much superior to the ordinary silvering mixture and the reflecting surface seems to be more brilliant. This improvement promises to revolutionize the mirror business, as it facilitates the silvering or platinizing of the largest and finest kinds of mirrors, at a hundredth part of the present cost. Specimens may be seen at the establishment of Julius H. Pratt, No. 86 Chamber street, New York.

Furnace Grate Bar.—Furnace grate bars are usually cast with a groove in the edge so that the ashes will lodge therein and thereby the injurious effect of the heat on said edges is reduced. The ashes protect said edges to some extent from being burned. The object of this invention is to facilitate the manufacture of such grate bars by casting them in pairs or two simultaneously on one and the same core whereby the labor is considerably reduced and a better article is produced, and furthermore by the taking for the core a chill or a piece of metal, the surfaces of the grooves are chilled and their faculty to conduct heat is thereby considerably reduced so that the same are much better able to be exposed to the heat of the fire than grate bars cast in the ordinary manner. J. A. Miller, 200 Broadway, is the inventor.

Safety Valve Regulator.—The operation of this invention is as follows:—When the regulator is set to control say a pressure of steam of 50 lbs. on the boiler, on the pressure getting up to 51 lbs. it will act as the ordinary spring balance supposing that to be suddenly unscrewed to 48, and on the pressure getting up further to 52 lbs. it will act as the spring balance if that were further immediately unscrewed to 46 lbs., and so on for every pound of increase of pressure on the boiler the regulator will allow the steam to blow through the safety valve at a similarly increasing rate, and this action is reversed on the steam coming down to the proper working pressure. It can also be made to indicate the pressure of the steam in pounds from 1 pound upward. Peter Riordan, Washington, D. C., is the inventor.

Manufacture of Paper Boxes.—This invention relates particularly to an improvement in that class of boxes which have heretofore been made of pasteboard, and are used in mercantile houses and trades of almost every kind under the name of paper boxes. The high price of paper and pasteboard has made it desirable to find some other cheaper material which can be worked in the same manner as pasteboard, and this object has been accomplished by the present invention which consists in the employment or use in place of pasteboard, of slats of wood prepared by gluing or pasting two or more thick pieces of veneers one on the other, the grain of one veneer being made to run endways to the grain of the other, until a sheet is obtained similar in size to the sheet of pasteboard so used in the manufacture of boxes, in such a manner that said sheet of wood can be marked off, folded and cut up for a number of boxes precisely in the same manner as pasteboard. Fred. W. Fliedner, 17 and 19 Bowery, New York, is the inventor.

Coal Oil Stove.—The object of this invention is to obtain a simple and portable stove in which coal oil may be economically used as a fuel. Coal oil, as is well known, generates, burnt in a lamp for illuminating purposes, a great amount of heat, and where a draught chimney is used a greater amount of heat is evolved or radiated from the lamp than when an open or no chimney burner has been used, in consequence of a more perfect combustion being obtained with the chimney burner. This invention consists in using with a coal oil lamp, of any suitable construction, a draught chimney, and a draw arranged in such a manner that the heat evolved or radiated from the lamp may be advantageously employed for cooking or culinary purposes. It consists further in applying to the chimney a door and glass by which the lamp may be lighted and the flame regulated without removing the chimney from the lamp. C. H. Reichmann, of New York City, is the inventor.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1855, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except in the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt on of their funds.

protected from violence. At a meeting of the committee of the Ironmasters' Association held in Wolverhampton on Wednesday, the offer was accepted, and an application was made to the Lord Lieutenant of the county for the needed protection. At the same meeting, the committee expressed themselves as altogether unable to give the Brierley Hill executive credit for their sincerity in their professed discountenancing of the North Staffordshire puddlers, facts having been brought to the knowledge of the committee which led them to conclude that, to say the least, the executive are winking at assistance being rendered. Very little more confidence was expressed in the Gateshead union; but the mill-men were spoken of in terms approaching to confidence in the sincerity of their motives relative to the North Staffordshire men. To show that the masters in South Staffordshire are equally willing with those in the North of England to come to terms with their men, the committee recommended the North Staffordshire masters to see a number of their men, to ascertain of what they complain and why they refuse to go to work. But no great confidence is expressed in the business result of the interview, for it is believed that the men will demand the wages for which they have struck, whilst their masters will certainly refuse to give it. All hope in the termination of the lock-out within a reasonable time is centered in the result of the scheme for introducing non-unionists into North Staffordshire. The masters continue to confine their attention to the question which brought about the lock-out—that of wages—and refuse to entertain any project for breaking up the union. They have no objection to their men having a union, if that union will only confine itself to legitimate business and not make itself intolerable by interference with the management of works."

A New Kind of Electrifying Machine.

The electro-magnetic coil has, in a great measure, superseded the electrifying machine; the latter, however, will never cease to be an object of interest; and, it is probable, will always be preferred for some purposes. The expense and difficulty of managing large plates and cylinders of glass have hitherto been obstacles to the use of large electrifying machines. These obstacles appear now removed—glass being rendered unnecessary by the discovery of a far more convenient and effective material. M. Edmond Bequerel exhibited to the Academy of Sciences on a recent occasion an electriying machine, the plate of which was made of indurated red sulphur, the invention of a civil engineer. It was eighty centimetres in diameter, and afforded a spark fourteen centimetres in length. No amalgamated cushions were required with it, the skin of a cat being quite sufficient to produce every desired effect. Sulphur undergoes extraordinary changes by successive fusions; becoming extremely hard and tenacious. After the third fusion it no longer acts on metals, or possesses its characteristic odor. The plate used by M. Bequerel was formed by fusing the sulphur three times in a cast-iron vessel, at a temperature between 250° and 300° Cent., and allowing it, after each fusion, to cool thoroughly. After the first and second fusions it was crushed to a coarse powder; and, after the third, it was poured into a plaster mold. Plates four metres in diameter may easily be made in this way; they cost extremely little; and, besides being more efficient, are far less hygrometric than glass.—*Intellectual Observer.*

Aluminum Bronze for Coins.

During the past year, says the Director of the U. S. mint, some interesting experiments were made with aluminum as an alloy for coins; not with a view to displace the bronze coinage, but to propose a system of tokens for five and ten cents. More than two years ago experiments were made in aluminum alloys to try their fitness for medals. Information was received from Paris that the introduction of only one per cent of aluminum into fine silver would resist the sulphuretted tarnish which is so apt to attack that metal in certain exposures. The experiments made here did not confirm that statement; on the contrary a slip of this alloy (99 silver to 1 aluminum) suffered more discoloration from the vapor of sulphuretted hydrogen than a slip of fine silver. The alloy was also much harder. An alloy of thirteen parts copper with one of aluminum was then tried, and another of nineteen parts copper to one of aluminum. The former gave a pale gold color, the latter the color of standard gold coin—both beautiful but too nearly resembling that precious metal. Under the press, however, they were both found to be so hard and stubborn, in spite of repeated blows, as to be quite impracticable. The question, however, was still open, whether a different proportion, and the low relief used for coin, would not give a satisfactory result. In fact, we had specimens of aluminum bronze coinage, effected by European manufacturers of aluminum, which proved that the striking was at least practicable, if not easy.

The Cornish Engine Deteriorating.

It appears from a report in the London *Mining Journal*, that the Cornish engine is falling to work as economically as in former years. This deterioration is probably as the authority in question says from want of care and proper attendance. We quote:—

"In the year 1811 Mr. Joel Lean began to report the performances of the Cornish engines, and daring that year, it is said, issued his first engine report. In the year 1827 an eminent engineer, Capt. Samuel Grose, commenced to improve the duty of steam engines at Great Wheel Towan. It is believed that practical experience has done more than scientific researches in procuring the high economy of fuel, which has been the result, and that this has been principally effected by the use of high pressure steam expansively employed, and using Mr. Trevithick's boilers, and clothing the steam pipes and cylinders with a non-conducting material, together with great attention of the engineemen to the fires, so as to make the best of every bushel of coals consumed, as some engineemen are now doing on the railways.

"In 1843 the average duty for 94 lbs. of coal was 60,000,000 lbs., while in 1856 it had steadily decreased to 47,000,000 lbs., for the same fuel. It is to be deeply regretted that the duty of our steam engines is decreasing, and that many of the important lessons taught by Capt. Grose appear to be forgotton; whilst we are brought familiar with the rapid improvements of locomotive and marine engines, we have to deplore a retrograde movement of the stationary engines in our Cornish mines. With the present low price of minerals, and reduced dividends, we certainly ought to try to bring up the duty of our steam engines to where it was in 1843. The number of pumping engines reported for January is 37. They have consumed 2846 tuns of coal, and lifted 22·3 million tuns of water ten frames high. The average duty of the whole is, therefore, 52,800,000 lbs. lifted one foot high, by the consumption of 112 lbs. of coal."

Solution of India-rubber.

A solution of caoutchouc or India-rubber, for repairing India-rubber shoes, is prepared in the following manner:—Cut two pounds of caoutchouc into thin, small slices; put them in a vessel of tinned sheet-iron, and pour over twelve to fourteen pounds of sulphide of carbon. For the promotion of solution place the vessel in another containing water previously heated up to about 86° Fahrenheit. The solution will take place promptly; but the fluid will thicken very soon, and thus render the application difficult if not impossible. In order to prevent this thickening and difficulty, a solution of caoutchouc and rosin (colophony) in spirits of turpentine must be added to the solution of caoutchouc in sulphide of carbon, and in such quantity that the mixture obtains the consistency of a thin paste. The solution of caoutchouc and rosin in spirits of turpentine should be prepared as follows:—Cut one pound of caontchouc into thin, small slices; heat them in a suitable vessel over a moderate coal fire until the caoutchouc becomes fluid, then add one-half pound of powdered rosin, and melt both materials at a moderate heat. When these materials are perfectly fluid, then gradually add three or four pounds of spirits of turpentine in small portions, and stir well. By the addition of this last solution, the rapid thickening and hardening of the compound will be prevented, and a mixture obtained fully answering the purpose of gluing together rubber surfaces, etc.—*American Drug Circular.*

Directions for Making Blacking.

Liquid.—Ivory black, in fine powder, 1 lb.; molasses, 3-4 lb.; sweet oil, 2 oz.; beer and vinegar, of each, 1 pint. Rub together the first three until the oil be perfectly "killed," then add the beer and vinegar. Ivory-black and treacle, of each 1 lb.; sweet oil and oil of vitriol, of each 1-4 lb. Mix the first three as before, then gradually add the vitriol, diluted with thrice its weight of water; mix well, and let it stand for 3 hours, when it may be reduced to a proper consistence with water or sour beer.

Paste.—Molasses, 1 lb.; Ivory-black 1 1-4 lbs.; sweet oil, 2 oz.; rub together as before, then add a little lemon juice or strong vinegar. Ivory black, 2 lbs.; molasses, 1 lb.: olive oil and oil of vitriol, of each 1-4 lb.; water q. s., as before.

The manipulations required for paste and liquid blacking are the same, the difference in the two being the quantity of liquid added. Thus, by diluting paste blacking with water or beer bottoms, it may be converted into liquid blacking of a similar quality, and, by using less fluid matter, the ingredients of liquid blacking will produce paste blacking. One thing must, however, be observed, and that is, that the ivory-black used for liquid blacking must be reduced to a much finer powder than for paste blacking, as, if this be not attended to, it will settle to the bottom, and be with difficulty diffused again through the liquid. For those persons who do not like the use of blacking containing oil of vitriol, the first of the above forms, either for paste or liquid, may be adopted. The vitriol, however, greatly contributes to promote the shining properties of the blacking, and in small quantities is not so injurious to the leather as has been falsely represented, as it wholly unites itself to the lime of the phosphate contained in the ivory-black, and is thus partly neutralized. This is the reason why lamp-black should never be employed for blacking, as it has no earthy base to absorb or neutralize the acid, which would then prove very hurtful to the leather. Oil of vitriol is now employed in the manufacture of all the most celebrated shining blackings. The addition of white of eggs, isinglass, gum arabic, and similar articles to blacking, always proves injurious, as they tend to stiffen the leather and to make it crack.—*Cooley.*

A Curious Clock.

A number of Union mechanics from the rebel prisons, now at the hospital of the Union Volunteer Refreshment Saloon, Phil., brought with them from Dixie a piece of their handiwork, well worth special mention. It consists of a clock, made to wile away their weary hours at Salisbury, N. C., during their imprisonment last winter. The main spring is made from the blade of a saber which once belonged to Stonewall Jackson. The hair-spring and balance-wheel were taken from the telegraph office timepiece, Andersonville, Ga. The hands are made of a toasting-fork from the kitchen of Vice-President Stephens. The wheels are made from the mountings of carriages, &c., of prominent southerners. The pillars which connect the frame are made of a ramrod, and nearly all the parts are taken from something picked up in the confederacy, and have more or less romance attached to them. A saw used in constructing this interesting little piece of mechanism was made of a table-knife; and files, jack-knives, &c., used in making rings, were often called into requisition by the anxious workmen.

Plants From Cuttings.

Peter Henderson, of Jersey City, a noted propagator, gives a simple mode of raising plants from cuttings, such as roses, verbenas, carnations etc., adapted to inexperienced cultivators, although not the mode used on an extended scale. A common flower-pot saucer, or even a common kitchen saucer or other dish, is filled with sand and the cuttings inserted thickly in it. It is then watered until it becomes about as liquid as mud.

The cuttings should, of course, be of green or unripened wood, three or four inches long, placed in a strong light in a room or green house, kept in a temperature of fifty to eighty degrees, best at seventy to seventy-five degrees, allowed to remain from ten to twenty days, till rooted, and the sand kept constantly in this semi-fluid state, for if they become partly dry they are ruined.

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Contents;

(Illustrations are indicated by an asterisk.)

AMENDMENT TO THE PATENT LAWS.—IMPORTANT TO PATENTEES.

The editorial letter from Washington published in our last number refers to an amendment now pending before Congress, designed to relieve a very large number of inventors who have failed to pay the balance of the patent fee—twenty dollars—within the six months as provided by law, thereby forfeiting their rights.

The language of the act of March 3, 1863, which requires payment of the balance fee within the six months after date of allowance, is peculiar. It provides that in default of said payment the invention shall become *public property as against the applicant*. The public acquire no rights in the invention as against another and subsequent inventor, leaving the original and first applicant only to suffer the consequences of not having paid the second fee within the time specified.

The rule of the Patent Office treats all such lapsed patents as judicially dead upon the record, and examiners are not allowed to refer to them under any circumstances, even though an application be made by another inventor for the same thing. Though this rule may be correct as based upon the language of the law of March 3, 1863, it nevertheless contravenes the plain intention of the statute of 1836, which requires that patents can issue only to the original and first inventor of the art, machine, composition or improvement. The same statute provides that whenever, in the Commissioner's opinion, two pending applications are adjudged to interfere with each other, that officer shall declare an interference, and require testimony with a view to determine the question of priority as between the applicants.

The amendment of 1863, however, conflicts with the law of 1836, inasmuch as it shuts off from this interference the unfortunate first applicant who has not paid up within the six months. Many might hastily jump at the conclusion that it would be serving an inventor right who thus failed to comply with the inexorable demands of the law; but we think no unprejudiced mind will thus reason, when a fair statement of the case is presented.

If an inventor wilfully neglect his duty as prescribed by the law, he is entitled to no sympathy, and ought not to ask for it; but the records of the Patent Office show most conclusively that there are hundreds of cases in which the applicant could not comply with the law. Many inventors justly plead inability to make the payment in time; some are entircly ignorant of the law on the subject, and for want of such information do not pay up in time; but it bears with peculiar hardship upon persons residing in foreign countries and upon those who are engaged in the military and naval service of the country. Inventors of this class are subject to all the changes and vicissitudes of the service, and are rarely ever stationed for a long time in one position.

There are many very aggravating cases, involving the interests of our brave soldiers, which appeal with great force for such relief as will be afforded to them by the bill now pending before Congress.

The act in question provides that an applicant whose patent has elapsed under the operation of the law of March 3, 1863, shall have a right to renew his application within two years after date of allowance, upon the payment of fifteen dollars, and to use the papers and model originally presented to the Patent Office. This we regard as a fair and equitable treatment of all such cases, and we trust that it will meet the approbation of Congress.

The bill has been carefully considered in all its bearings, and has received the unqualified sanction of the Hon. Commissioner of Patents. It now only awaits the action of Congress to become a law of relief. It is vastly important, however, that it should pass at this session in order to allow all such cases to be included within its provisions. If it be put over till the next Congress the term of two years, as provided in the bill for the renewal of applications, will have expired before favorable action can be had.

Inventors who are suffering under the operation of this law of limitation ought to write to their members of Congress to look after the bill, and not allow it to slumber for want of attention.

ARE BANK DEPOSITS CURRENCY?

Hunt's Merchants' Magazine, under its new management, exhibits a mastery of economic science which gives remarkable interest and force to its discussion of financial questions. In the last number is an article on The National Finances, by Hon. Amasa Walker, the several positions of which seem to us sound, with one exception. This is embraced in the sentence, "The bank currency of the nation, at the present time, reckoning the circulation at $250,000,000, and the deposits at $450,000,000, is $700,000,000."

The currency or money of this country at the present time is of two kinds. In the States lying on the Pacific it consists of flat disks of two metals, gold and silver. In the remainder of the country it is a mixture of metallic disks and notes, the metal being an alloy of copper and nickel, and the notes being partly those of the United States Government, and partly those of certain joint stock companies or associations of individuals, called banks. The managers of these companies have succeeded in so establishing their credit, that their notes are received by people in exchange for the most valuable property, and have finally come into use as money. This same credit induces people who have money on hand which they do not intend to use immediately, to leave it with some bank for safe-keeping. If the banks kept these deposits on hand in the form of money, it would be a portion of the currency of the country; but this is not the case.

Deposits are usually made with banks in the first instance in the form of notes. One trader sells to another $1,000 worth of merchandise on six months credit, the purchaser giving his note for the amount. The seller sends his note to the bank for discount; the interest is deducted, and the remainder is carried to the trader's credit as a deposit.

If the trader now buys goods for cash, he draws his check for the amount; the seller of these goods sends the check to his bank, where it is entered to his credit as a deposit, and after its passage through the clearing house it is charged to the drawer, diminishing his deposits to the same extent. This is the ordinary course of business.

It will be seen that bank deposits are simply ledger balances, being the records of the transfer and ownership of merchandise. There is no more propriety in calling them currency, than there is in calling a barrel of pork, currency.

If a bank has on hand any notes of other banks, thore notes are money, or currency. But they are part of the circulation, and are included in the $250,000,000.

CORN HUSK FOR PAPER STOCK.

We are informed that the process for making paper from corn husks, of which so much has been said in the SCIENTIFIC AMERICAN, is about to be tried here on an extensive scale in a short time. If successful, printing paper especially is to be largely manufactured.

Corn husks have doubtless been fed out to cattle universally this winter, but expensive as hay is it is questionable economy to do so now when there is a prospect of obtaining a high price for the husks before spring. We therefore suggest that our agricultural readers carefully husband their stock of this staple, for a time at least, as the demand for it is likely to make it much more valuable than it is in the shape of cattle feed.

We sincerely hope and believe that the preliminary trials with corn husks for paper stock will prove to be what it has been represented, and further, that energetic measures will be taken to put the manufacture in market, for newspaper publishers have no heavier tax in their business than the price of printing paper.

It is stated that proprietors of the leading papers in this city have secured the right to make paper from this substance, and farmers are requested to address D. A. Craig, General Agent of the Associated Press, New York City, in reference to any quantity of corn husks they may have to dispose of.

HOT BEARINGS.

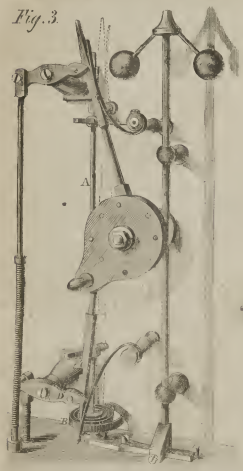
Detention and delay of steam vessels by hot bearings is not an uncommon occurrence. We read in reports of trial trips "the ship was delayed some hours by hot bearings." These few words convey no idea to the nnniniated, of the engineer's anxiety, the impatience of the captain and sailing officers on such occasions. There are some screw steamers out of this port which have an inch and a half stream of water constantly running on the main shaft-bearing. Such nastiness as this creates is beyond expression. Those who go below in the performance of their duties are agreeably (!) surprised by warm jets of greasy spray, and besmeared from head to foot. The bilge pumps are forever going, or the bilge injection is kept wide open to free the ship from the water. No lubrication takes place, for the oil is washed out as fast as it is poured in, and the main bearing has little more oil than the stern bearing, which runs under water.

Aside from faults of design which are often the sole cause, there are others which relate to mere manipulation or adjustment which may be here alluded to. Bearings often heat from being what is technically called "collar bound," or so tight sidewise that there is no motion.

Paddle wheel steamers rolling in a sea-way invariably heat and cut at the collars when the brasses are tighter at the point designated. When cutting once begins the fine metal abraded gets in and tears up the whole surface, rendering it hot in a short time. Badly fitted boxes also heat quickly. There will always be one part of the bearing where the chief work is done. A horizontal engine bearing wears chiefly at the sides, and chocks are provided for the purpose of taking the brasses up at these points. Vertical engine bearings wear at the bottom and top, and the labor is always in the direction of the stroke of the piston. Thus the brasses and bearings are continually wearing oval, or out of rotundity, and have to be chipped off to bring them down. When heating is not caused by defective adjustment, and is simply a fault of design, it is often of advantage to "doctor" the lubricant, and for this purpose blacklead and oil are useful. Sulphur and oil are also employed, and many engineers advocate the use of soapstone finely pulverized. Blacklead and tallow is also used for heavy bearings. All of these mixtures are nasty, and are chiefly valuable for their heavy body. Sulphur possesses no refrigerating power on a hot shaft, whatever it may do to the human body Blacklead has a certain smoothness which is valuable, and there is virtue in tallow. There is still an-

pulley or break, the regulator balls drop down far enough to trip a lever (not shown) by means of an inclined sliding piece made to work in or out of the way, as occasion may require. This action liberates a ratchet gear on the end of the upright shaft, A, thereby causing the shaft to turn round by means of a spring, B, far enough to throw back the hooks, C, from the pins, D. These hooks operate the main

Fig. 3.



spring attached to draw up the back end of the trip lever, B, far enough to depress the shoes, C, from their catches. The springs are so fixed in every case as not to affect the free action of the governor.

FIGURE 6.

This arrangement is applicable to engines of the Green patent, but may be applied to others of various kinds. In the case of the Green engine, if the governor belt breaks or slips, the shaft moves up far enough to throw out the lever, A, from its groove, B (see section), thus liberating the shaft, which is thrown down by means of a spring, C, far enough to depress the tappets, so they will pass by the catches. Some springs are made so as to be inside of the coup-

Fig. 4.

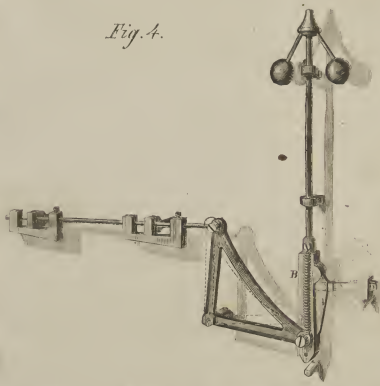
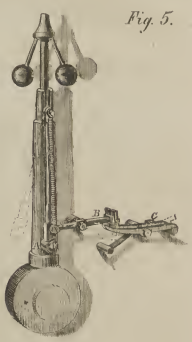


Fig. 5.



applied, in no way interferes with the free action of the regulator, and a wire may, in all cases, be attached to the stop motion so as to stop the engine from any room or from a distance of several blocks of buildings.

Applications for patents are now pending on the several plans above illustrated which are not specified as being already patented. For further particulars address the Automatic Stop-motion Company, Newburyport, Mass.

HOW TO DETECT COUNTERFEITS.

We have received from the authors, Messrs. E. J. Wilber and E. P. Eastman, of the Commercial Col-

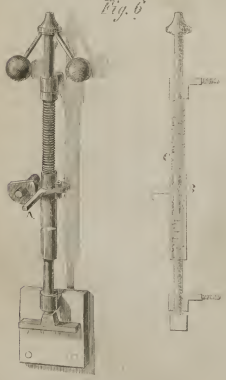
AUTOMATIC STOP-MOTION FOR STEAM ENGINES.

valves which, of course, cease moving when the two are disconnected.

FIGURE 4.

This arrangement is applicable to a double engine. In case the regulator belt should break or slip on its

Fig. 6.



pulley, the balls would drop down far enough to liberate the straight or bent arm, A, thereby causing a pin in the slotted coupling to be released and drawn up by means of the spring, B, throwing the inclines far back enough to depress the hooks from their catches, thus stopping the engines.

FIGURE 5.

When the regulator, from any cause, drops down, the hook, whose lower end is an incline, strikes upon a cam, A—which may be turned up or down at pleasure—and is thrown off from its pin, thus enabling a

ling, being much more slightly in this way than where they are on the exterior.

FIGURE 7.

This is a straight or bent lever, A, terminating in a ball, B, both attached to a shoe, C, with a regulating screw, D, for adjusting the position of the lever, A, so that it may be set at any required angle. In case of an increase of speed this ball will be thrown over far enough to trip the shoe off, as shown by

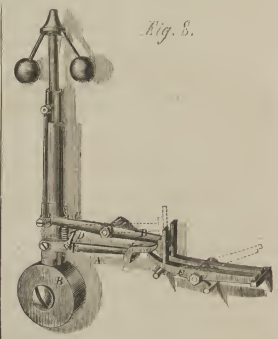
Fig. 7.

dotted lines. On the Green engine it may be attached to the sliding bar for the purpose of depressing the tappets so that they may pass without catching. This is entirely independent of the regulator.

FIGURE 8

This arrangement is a forked lever, A, one end or which is attached to the regulator stand, B, the other end is supported by a spiral spring, C. The forked lever, A, is put in operation by the trip lever, B, by means of the button or arm, D, which may be turned up or down. When the regulator drops down it depresses the forked lever far enough to liberate the shoes, E, from the catches. The invention, however

Fig. 8.



lege, Poughkeepsie, N. Y., a copy of their treatise on counterfeit bank notes. It is an elegant little volume of 50 pages, gilt edged, handsomely bound in red cloth, and illustrated with a large number of fine copper and steel plate engravings made by the New York Bank Note Company. The several parts of a bank note are minutely described, and the differences between the genuine and the counterfeit are fully pointed out. As a sample of this work we extract what is said in relation to portraits:—

"In no department of the counterfeiter's art has he met with more signal failure than in attempting to delineate the 'human face divine,' which, as one has beautifully and truthfully observed, 'is the painted stage and natural robing-room of the soul.'

'GENUINE.—In the true bill, the mouth, eyes and face have an expression clear and distinct.

"The hair, even in its most delicate wavings and strands, is accurately copied. The hands, and especially the fingers, will be found proportioned to the

figure. The texture of the skin has not escaped attention, and indeed, in every respect, to the very minutiæ of detail, the portrait will bear close scrutiny.

"The more familiar portraits, as those of Washington, Franklin, Clay and Webster, 'the old familiar faces,' will strike the eye at once as being accurate, and the longer and more critically observed, the more perfect will the resemblance appear.

"COUNTERFEIT.—In the counterfeit, the eye will be found not unfrequently without a pupil; the delicate lines about the mouth omitted or constrained so as to give a rigid and unnatural expression to that very important feature of the face; black lines encircle the head, spots and broken lines appear on the cheek and neck, none of which are seen on genuine notes. Bank-notes may be so nearly worn out, it is true, as to make it no easy task to trace and follow out the symmetry and fineness of all parts of the portrait; but if any portion of the portrait is left entire, our remarks will be found applicable to that portion."

Price of the work two dollars.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Stills for Petroleum and other Liquids.—This invention is the subject of three patents. The first is for making a combustion chamber in the furnace of stills, which rises upward within the retort, and thereby heats the body of the charge in the retort within, while the charge is also exposed to heat on the outside of the retort. The second is for surrounding the retort of a still outside of the flue space with a jacket of non-conducting material to prevent the loss of heat; also in the use of steam for cleaning the retort from residuum or sediment which may collect on its bottom; also in a peculiar construction of furnace by which air is supplied to and mixed with gas before they issue from the fire surface of the furnace. The third patent is for placing a movable furnace below a still, so that the heat can be regulated; also in the construction of a hollow furnace for using gas and air combined, and which are mixed in the furnace itself, and delivered through holes in the top plate of the furnace. G. H. S. Duffus, of New Orleans, La., is the inventor.

Pump.—This invention consists in an oscillating vacuum pump whose valve is opened by means of the contact of the valve stem with an inclined plane below it, and closed by a spring. The joint of the valve stem is packed by means of an elastic ring, and the hollow journal which connects the cylinder with the receiver is also packed by a like ring. A. S. Lyman, of New York City, is the inventor.

Safeguard for Protecting Pottery Ware.—Pottery ware, during the process of burning or baking, requires to be protected from cinders, smoke and other substances which are liable to come in contact with it and impair its value. At present the articles or ware are placed within a cylinder made of fire clay, and provided with a close bottom, the articles being placed one over the other, and prevented from being in contact by means of rods or pins. The cylinders are made of various sizes, according to the size of the articles they are to receive, and are placed one over the other in the furnace, in rows or tiers. These cylinders, commonly termed safeguards or saggers, are attended with some disadvantages. In the first place it is rather difficult to adjust the articles in and remove them from the cylinders, and considerable room or space is lost by them, and the top article in each cylinder liable to be injured by fragments dropping from the bottom of the cylinder immediately above. These difficulties are fully obviated by this invention, which consists in forming the cylinders of a series of rings, provided with a flange or annular lip at their lower edges, and with a corresponding recess in their upper edges, so that one ring may be fitted over the other, a vessel or article to be burned or baked being fitted in each ring, and resting on pins thereon. Benjamin Jackson, Trenton, N. J., is the inventor.

Steam Boiler.—This invention relates to a new and improved application of a float to steam boilers, for the purpose of indicating the hight of the water therein, sounding an alarm when the water is below a certain level, and also, if necessary or desired, be made the means for putting in operation a pump to supply the boiler. The objection to the use of floats in steam boilers to indicate the hight of the water has been that they are frequently affected by the foam so as to be very unreliable, and further that the gage rod attached to the float and passing through a stuffing box or guides is so restricted in its free movement by friction as to render the action of the float very uncertain. This invention is designed to obviate these difficulties, and to this end it consists in isolating the float from the mass or bulk of water in the boiler and still have the float expand to the same influences of buoyancy and steam pressure as when in the boiler, whereby the float is rendered reliable by being placed beyond the action of foam. The invention consists further in connecting the float rod with a lever at the exterior of the boiler in such a manner as to avoid all inaccuracies due from friction, and at the same time form a perfect water-tight joint, where the rods, which form a connection between the float rod and the lever, pass through the casing or box in which the float rod is fitted or works. Joseph Yates, of Mott Haven, N. Y., is the inventor.

Portable Lantern.—This invention consists in combining a socket or spring to receive a candle, with a case having a glass front, and in such a manner that the tube may be shoved entirely within the case when the lantern is not required for use, and also adjusted so that the tube may serve as a handle when the lantern is in use and a handle is required. The case of the lantern is provided with a cover, which closes over the glass part and protects it when the lantern is not in use, and is capable of being raised to serve as a reflector when the lantern is in use. The invention is more especially designed for army or camp purposes, but it will prove a convenient device for general use, it being durable, and the case constructed in such a manner that no solder is required, which frequently melts under the heat of the flame, and causes the parts to become detached. Charles Deavs, assignor to Archer & Pancoast, of 9 Mercer street, New York City, is the inventor.

Folding Chair, Table, Etc.—This invention consists in a folding chair, table or other similar article, the seat or top of which is made of canvas or other flexible material, and supported by a series of radiating arms, which are hinged to a central hub, secured to the upper end of a longitudinally-sliding staff, in combination with hinged braces, connected to the radiating arms, and made to radiate from a sleeve through which the staff slides, and which is supported by hinged legs connecting by means of toggle arms with a ring fitted on the lower end of the central staff in such a manner that by expanding the legs and depressing the central staff the seat or top is expanded and rendered rigid, and at the same time the toggle arms assume such a position they retain the legs and prevent them from collapsing accidentally; but by slightly raising the center staff the toggle arms are brought in such a position that the chair, table or other article can be folded up with the greatest convenience and in a small compass. If desired, the legs and seat or top may be disconnected and each folded or expanded separately. Ferdinand Ludke, 287½ Bowery, New York, is the inventor.

Improvement in Mirrors.—We have lately examined some most beautiful specimens of mirrors prepared by a new process for which a patent has just been granted to Louis Paul Angenard, of New York city. The reflecting compound is made in the following manner:—Dissolve two-thirds of an ounce of platinum, by means of heat, in two and a half ounces of muriatic acid and one and one-sixteenth ounces of nitric acid. Evaporate the acids; then pulverize the mass, reduce with alcohol, and apply the solution with a brush to the glass surface. The glass is then heated in an oven till it reaches the cherry-red color, when it is allowed to cool and the operation is finished. The whole process is exceedingly simple, quick and economical, and the resulting mirrors are of superior quality. The adhesive properties of the compound are much superior to the ordinary silvering mixture and the reflecting surface seems to be more brilliant. This improvement promises to revolutionize the mirror business, as it facilitates the silvering or platinizing of the largest and finest kinds of mirrors, at a hundredth part of the present cost. Specimens may be seen at the establishment of Julius H. Pratt, No. 86 Chamber street, New York.

Furnace Grate Bar.—Furnace grate bars are usually cast with a groove in the edge so that the ashes will lodge therein and thereby the injurious effect of the heat on said edges is reduced. The ashes protect said edges to some extent from being burned. The object of this invention is to facilitate the manufacture of such grate bars by casting them in pairs or two simultaneously on one and the same core whereby the labor is considerably reduced and a better article is produced, and furthermore by the taking for the core a chill or a piece of metal, the surfaces of the grooves are chilled and their faculty to conduct heat is thereby considerably reduced so that the same are much better able to be exposed to the heat of the fire than grate bars cast in the ordinary manner. J. A. Miller, 200 Broadway, is the inventor.

Safety Valve Regulator.—The operation of this invention is as follows:—When the regulator is set to control say a pressure of steam of 50 lbs. on the boiler, on the pressure getting up to 51 lbs. it will act as the ordinary spring balance supposing that to be suddenly unscrewed to 48, and on the pressure getting up further to 52 lbs. it will act as the spring balance if that were further immediately unscrewed to 46 lbs., and so on for every pound of increase of pressure on the boiler the regulator will allow the steam to blow through the safety valve at a similarly increasing rate, and this action is reversed on the steam coming down to the proper working pressure. It can also be made to indicate the pressure of the steam in pounds from 1 pound upward. Peter Riordan, Washington, D. C., is the inventor.

Manufacture of Paper Boxes.—This invention relates particularly to an improvement in that class of boxes which have heretofore been made of pasteboard, and are used in mercantile houses and trades of almost every kind under the name of paper boxes. The high price of paper and pasteboard has made it desirable to find some other cheaper material which can be worked in the same manner as pasteboard, and this object has been accomplished by the present invention which consists in the employment or use in place of pasteboard, of slats of wood prepared by gluing or pasting two or more thick pieces of veneers one on the other, the grain of one veneer being made to run endways to the grain of the other, until a sheet is obtained similar in size to the sheet of pasteboard so used in the manufacture of boxes, in such a manner that said sheet of wood can be marked off, folded and cut up for a number of boxes precisely in the same manner as pasteboard. Fred. W. Fliedner, 17 and 19 Bowery, New York, is the inventor.

Coal Oil Stove.—The object of this invention is to obtain a simple and portable stove in which coal oil may be economically used as a fuel. Coal oil, as is well known, generates, burnt in a lamp for illuminating purposes, a great amount of heat, and where a draught chimney is used a greater amount of heat is evolved or radiated from the lamp than when an open or no chimney burner has been used, in consequence of a more perfect combustion being obtained with the chimney burner. This invention consists in using with a coal oil lamp, of any suitable construction, a draught chimney, and a draw arranged in such a manner that the heat evolved or radiated from the lamp may be advantageously employed for cooking or culinary purposes. It consists further in applying to the chimney a door and glass by which the lamp may be lighted and the flame regulated without removing the chimney from the lamp. C. H. Reichmann, of New York City, is the inventor.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1855, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except in the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our receipt on of their funds.

protected from violence. At a meeting of the committee of the Ironmasters' Association held in Wolverhampton on Wednesday, the offer was accepted, and an application was made to the Lord Lieutenant of the county for the needed protection. At the same meeting, the committee expressed themselves as altogether unable to give the Brierley Hill executive credit for their sincerity in their professed discountenancing of the North Staffordshire puddlers, facts having been brought to the knowledge of the committee which led them to conclude that, to say the least, the executive are winking at assistance being rendered. Very little more confidence was expressed in the Gateshead union; but the mill-men were spoken of in terms approaching to confidence in the sincerity of their motives relative to the North Staffordshire men. To show that the masters in South Staffordshire are equally willing with those in the North of England to come to terms with their men, the committee recommended the North Staffordshire masters to see a number of their men, to ascertain of what they complain and why they refuse to go to work. But no great confidence is expressed in the business result of the interview, for it is believed that the men will demand the wages for which they have struck, whilst their masters will certainly refuse to give it. All hope in the termination of the lock-out within a reasonable time is centered in the result of the scheme for introducing non-unionists into North Staffordshire. The masters continue to confine their attention to the question which brought about the lock-out—that of wages—and refuse to entertain any project for breaking up the union. They have no objection to their men having a union, if that union will only confine itself to legitimate business and not make itself intolerable by interference with the management of works."

A New Kind of Electrifying Machine.

The electro-magnetic coil has, in a great measure, superseded the electrifying machine; the latter, however, will never cease to be an object of interest; and, it is probable, will always be preferred for some purposes. The expense and difficulty of managing large plates and cylinders of glass have hitherto been obstacles to the use of large electrifying machines. These obstacles appear now removed—glass being rendered unnecessary by the discovery of a far more convenient and effective material. M. Edmond Bequerel exhibited to the Academy of Sciences on a recent occasion an electriying machine, the plate of which was made of indurated red sulphur, the invention of a civil engineer. It was eighty centimetres in diameter, and afforded a spark fourteen centimetres in length. No amalgamated cushions were required with it, the skin of a cat being quite sufficient to produce every desired effect. Sulphur undergoes extraordinary changes by successive fusions; becoming extremely hard and tenacious. After the third fusion it no longer acts on metals, or possesses its characteristic odor. The plate used by M. Bequerel was formed by fusing the sulphur three times in a cast-iron vessel, at a temperature between 250° and 300° Cent., and allowing it, after each fusion, to cool thoroughly. After the first and second fusions it was crushed to a coarse powder; and, after the third, it was poured into a plaster mold. Plates four metres in diameter may easily be made in this way; they cost extremely little; and, besides being more efficient, are far less hygrometric than glass.—*Intellectual Observer.*

Aluminum Bronze for Coins.

During the past year, says the Director of the U. S. mint, some interesting experiments were made with aluminum as an alloy for coins; not with a view to displace the bronze coinage, but to propose a system of tokens for five and ten cents. More than two years ago experiments were made in aluminum alloys to try their fitness for medals. Information was received from Paris that the introduction of only one per cent of aluminum into fine silver would resist the sulphuretted tarnish which is so apt to attack that metal in certain exposures. The experiments made here did not confirm that statement; on the contrary a slip of this alloy (99 silver to 1 aluminum) suffered more discoloration from the vapor of sulphuretted hydrogen than a slip of fine silver. The alloy was also much harder. An alloy of thirteen parts copper with one of aluminum was then tried, and another of nineteen parts copper to one of aluminum. The former gave a pale gold color, the latter the color of standard gold coin—both beautiful but too nearly resembling that precious metal. Under the press, however, they were both found to be so hard and stubborn, in spite of repeated blows, as to be quite impracticable. The question, however, was still open, whether a different proportion, and the low relief used for coin, would not give a satisfactory result. In fact, we had specimens of aluminum bronze coinage, effected by European manufacturers of aluminum, which proved that the striking was at least practicable, if not easy.

The Cornish Engine Deteriorating.

It appears from a report in the London *Mining Journal*, that the Cornish engine is falling to work as economically as in former years. This deterioration is probably as the authority in question says from want of care and proper attendance. We quote:—

"In the year 1811 Mr. Joel Lean began to report the performances of the Cornish engines, and daring that year, it is said, issued his first engine report. In the year 1827 an eminent engineer, Capt. Samuel Grose, commenced to improve the duty of steam engines at Great Wheel Towan. It is believed that practical experience has done more than scientific researches in procuring the high economy of fuel, which has been the result, and that this has been principally effected by the use of high pressure steam expansively employed, and using Mr. Trevithick's boilers, and clothing the steam pipes and cylinders with a non-conducting material, together with great attention of the engineemen to the fires, so as to make the best of every bushel of coals consumed, as some engineemen are now doing on the railways.

"In 1843 the average duty for 94 lbs. of coal was 60,000,000 lbs., while in 1856 it had steadily decreased to 47,000,000 lbs., for the same fuel. It is to be deeply regretted that the duty of our steam engines is decreasing, and that many of the important lessons taught by Capt. Grose appear to be forgotton; whilst we are brought familiar with the rapid improvements of locomotive and marine engines, we have to deplore a retrograde movement of the stationary engines in our Cornish mines. With the present low price of minerals, and reduced dividends, we certainly ought to try to bring up the duty of our steam engines to where it was in 1843. The number of pumping engines reported for January is 37. They have consumed 2846 tuns of coal, and lifted 22·3 million tuns of water ten frames high. The average duty of the whole is, therefore, 52,800,000 lbs. lifted one foot high, by the consumption of 112 lbs. of coal."

Solution of India-rubber.

A solution of caoutchouc or India-rubber, for repairing India-rubber shoes, is prepared in the following manner:—Cut two pounds of caoutchouc into thin, small slices; put them in a vessel of tinned sheet-iron, and pour over twelve to fourteen pounds of sulphide of carbon. For the promotion of solution place the vessel in another containing water previously heated up to about 86° Fahrenheit. The solution will take place promptly; but the fluid will thicken very soon, and thus render the application difficult if not impossible. In order to prevent this thickening and difficulty, a solution of caoutchouc and rosin (colophony) in spirits of turpentine must be added to the solution of caoutchouc in sulphide of carbon, and in such quantity that the mixture obtains the consistency of a thin paste. The solution of caoutchouc and rosin in spirits of turpentine should be prepared as follows:—Cut one pound of caontchouc into thin, small slices; heat them in a suitable vessel over a moderate coal fire until the caoutchouc becomes fluid, then add one-half pound of powdered rosin, and melt both materials at a moderate heat. When these materials are perfectly fluid, then gradually add three or four pounds of spirits of turpentine in small portions, and stir well. By the addition of this last solution, the rapid thickening and hardening of the compound will be prevented, and a mixture obtained fully answering the purpose of gluing together rubber surfaces, etc.—*American Drug Circular.*

Directions for Making Blacking.

Liquid.—Ivory black, in fine powder, 1 lb.; molasses, 3-4 lb.; sweet oil, 2 oz.; beer and vinegar, of each, 1 pint. Rub together the first three until the oil be perfectly "killed," then add the beer and vinegar. Ivory-black and treacle, of each 1 lb.; sweet oil and oil of vitriol, of each 1-4 lb. Mix the first three as before, then gradually add the vitriol, diluted with thrice its weight of water; mix well, and let it stand for 3 hours, when it may be reduced to a proper consistence with water or sour beer.

Paste.—Molasses, 1 lb.; Ivory-black 1 1-4 lbs.; sweet oil, 2 oz.; rub together as before, then add a little lemon juice or strong vinegar. Ivory black, 2 lbs.; molasses, 1 lb.: olive oil and oil of vitriol, of each 1-4 lb.; water q. s., as before.

The manipulations required for paste and liquid blacking are the same, the difference in the two being the quantity of liquid added. Thus, by diluting paste blacking with water or beer bottoms, it may be converted into liquid blacking of a similar quality, and, by using less fluid matter, the ingredients of liquid blacking will produce paste blacking. One thing must, however, be observed, and that is, that the ivory-black used for liquid blacking must be reduced to a much finer powder than for paste blacking, as, if this be not attended to, it will settle to the bottom, and be with difficulty diffused again through the liquid. For those persons who do not like the use of blacking containing oil of vitriol, the first of the above forms, either for paste or liquid, may be adopted. The vitriol, however, greatly contributes to promote the shining properties of the blacking, and in small quantities is not so injurious to the leather as has been falsely represented, as it wholly unites itself to the lime of the phosphate contained in the ivory-black, and is thus partly neutralized. This is the reason why lamp-black should never be employed for blacking, as it has no earthy base to absorb or neutralize the acid, which would then prove very hurtful to the leather. Oil of vitriol is now employed in the manufacture of all the most celebrated shining blackings. The addition of white of eggs, isinglass, gum arabic, and similar articles to blacking, always proves injurious, as they tend to stiffen the leather and to make it crack.—*Cooley.*

A Curious Clock.

A number of Union mechanics from the rebel prisons, now at the hospital of the Union Volunteer Refreshment Saloon, Phil., brought with them from Dixie a piece of their handiwork, well worth special mention. It consists of a clock, made to wile away their weary hours at Salisbury, N. C., during their imprisonment last winter. The main spring is made from the blade of a saber which once belonged to Stonewall Jackson. The hair-spring and balance-wheel were taken from the telegraph office timepiece, Andersonville, Ga. The hands are made of a toasting-fork from the kitchen of Vice-President Stephens. The wheels are made from the mountings of carriages, &c., of prominent southerners. The pillars which connect the frame are made of a ramrod, and nearly all the parts are taken from something picked up in the confederacy, and have more or less romance attached to them. A saw used in constructing this interesting little piece of mechanism was made of a table-knife; and files, jack-knives, &c., used in making rings, were often called into requisition by the anxious workmen.

Plants From Cuttings.

Peter Henderson, of Jersey City, a noted propagator, gives a simple mode of raising plants from cuttings, such as roses, verbenas, carnations etc., adapted to inexperienced cultivators, although not the mode used on an extended scale. A common flower-pot saucer, or even a common kitchen saucer or other dish, is filled with sand and the cuttings inserted thickly in it. It is then watered until it becomes about as liquid as mud.

The cuttings should, of course, be of green or unripened wood, three or four inches long, placed in a strong light in a room or green house, kept in a temperature of fifty to eighty degrees, best at seventy to seventy-five degrees, allowed to remain from ten to twenty days, till rooted, and the sand kept constantly in this semi-fluid state, for if they become partly dry they are ruined.

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Contents:

(Illustrations are indicated by an asterisk.)

THE DIFFERENCE BETWEEN NATIONAL BANKS AND STATE BANKS.

A bank is an association of individuals who have clubbed a portion of their capital in a joint-stock company, in order to loan it with less liability of losing the whole.

When such an association has provided itself with strong iron boxes and stone vaults, for keeping the money it has on hand safely, various individuals in the community who chance to have sums of money in their possession which they do not wish to use at present, take them to the bank for safe keeping. Experience has shown that there is no danger that all of these deposits will be called for at the same time, and that consequently the banks may venture to loan a portion of them and pocket the interest.

Experience has also shown that when a bank has established its credit, its own notes will pass from hand to hand in the community as money. Banks accordingly exchange their notes not on interest for the notes of business men drawing interest.

These are the two principal sources of profit to banks—the interest which they obtain by loaning their deposits and their circulation. If a bank be shrewdly managed these profits will usually more than pay the rents, salaries, and other expenses of the establishment. Many banks while loaning their means at 6 per cent interest have divided more than 8 per cent to their stockholders.

The temptation to make these profits as large as possible frequently seduces directors of banks to loan a larger portion of their deposits than is prudent, and if circumstances cause a more than usual demand for payment by depositors, the banks find themselves unable to comply, and are forced to suspend payment. The banks having paid away their cash on hand to depositors are without means to face the call for payments of their own notes in circulation, and thus the community finds a large portion of its money suddenly changed from notes worth their amount in gold into a mass of irredeemable paper.

The great loss and inconvenience resulting from the frequent failure of banks to pay their own notes have led to many attempts by the legislatures of different States to provide a remedy for the evil. The plan finally adopted by the State of New York seems to be the most effectual of any yet suggested. By this plan, all banks are prohibited from issuing any notes for circulation as money until they have deposited with an officer appointed by the State the full amount of the notes and something more, in mortgages, State bonds or other valuable and saleable property. Then, if the bank fail to pay its notes, the State officer holding these securities belonging to the bank is directed to sell them immediately, and apply the proceeds to pay the notes.

The national bank law is simply the application of the New York banking law to the whole country, with a few modifications. A national bank delivers to the Treasurer of the United States a certain amount of United States bonds, for which the bank has paid. The Treasurer gives a receipt for the bonds and lays them away in a strong vault; he also delivers to the bank 90 per cent of the amount of the bonds in "national currency" notes, which the bank may loan on interest. It the bank refuse to pay any of these notes on demand, the Treasurer of the United States will pay them, and the deposited bonds belonging to the bank will be sold or canceled to an equal amount. The law also provides that these notes shall be received at par in payment of all taxes and dues to the United States except duties on imports. These provisions make the notes of the national banks the best paper currency that we have ever had, excepting the legal-tender treasury notes, which would have been a perfect currency if they had not been issued in excessive amount.

Our State banks are gradually entering upon the national system, and we think, before many months have elapsed, that the whole State banking system of the country will be based upon national securities—a result which we regard as very desirable to the community.

THE "STONEWALL."

The latest sensation in this hour of sensations is the appearance at Nassau of the rebel ram *Stonewall, alias Olinde, alias* several other titles not necessary to mention.

This vessel was designed to break up the blockade of our coast, but coming in too late for the fray has been disappointed, and will probably go back, we are sorry to say, without a battle. We regret this, for we have already so many specimens of English iron vessels in our possession bulk for speed that we should like to have one French ship, built for strength, so that we may see what their claims to invulnerability are based upon.

In another part of this journal we have reprinted a graphic and clear description of this vessel, from a correspondent of the *Herald*. It will be seen in this account that the ram is armed with 70-pounders, and a 300-pounder. As we are not supposed to run away from the fearful appearance of the exterior, the guns and armor are all we need take into account.

"What man has done man may do," and we have already encountered an enemy much more formidable than this two-keeled, two-wheeled nondescript, and vanquished it with ease, so that, not unreasonably, we may hope to repeat the performance when occasion serves.

The *Stonewall* has stationary turrets of oak, 18 inches thick, plated with iron two inches thick. To this remarkably stanch structure the safe keeping of the crew, guns and machinery for working them, is committed. Of the side armor it is not necessary to speak; let it be ten feet thick if necessary, there is no occasion to waste powder in attacking or ink in describing it, when the vulnerable points are placed above it.

The *Atlanta* rebel iron-clad had 4½-inch iron plating, backed with two feet of Georgia pine, and the *Tennessee* had 5-inch plates, backed with two feet of oak. Both of these vessels were attacked by monitors with 15-inch guns, and surrendered to them, only after being compelled to by having their sides broken in. The rebel vessels were armed with heavy rifles 7½-inch bore, re-enforced by wrought-iron bands, but failed to injure our iron-clad vessels in the slightest degree, while the 15-inch shot burst in the sides of the *Tennessee* and *Atlanta* when they struck her fairly.

These are simple facts that it may be well to bear in mind when the ram fever prevails. We do not commit the folly of underrating an adversary; we have fought and conquered better ships with heavier metal, both on the broadside and thrown from it, than the *Stonewall*, and we are not to be appalled by the presence of an inferior ship or the boasts of her officers. They know only too well that prudence is the better part of valor and will never come within range of the 15-inch guns. If they do they will be as certainly smashed as thunder is to follow lightning.

INEFFICIENT MACHINERY.

Twenty years ago, when machinery was just beginning to be appreciated, and mobs having ceased to destroy, learned to respect it for its usefulness, any tool that would do more than a man could was to be commended; but in a quarter of a century we have made some progress in the arts, and those machines which were once economical are no longer so.

We see clanking, rattling, jerking chains instead of screws, on iron planers; miserable feed arrangements and worse accommodations for tool holders in lathes; chucks that are good for nothing but to jam men's fingers, and have to be taken to pieces for every new job; bolt cutters that cut bad threads and strip half of them at that; taps of no pitch and no shape to the thread; nuts that are not alike on any two sides and that no one wrench will fit; and many other minor matters unnecessary to detail at greater length, but all vexatious, and obstacles in the way of improvement.

That these simple things exercise a great influence on the profits of any concern is not to be denied, for to do a given amount of work either greater motive power is consumed or the proprietor and all hands must work harder. We believe that it would be true economy for shops that own a stock of poor and old-fashioned machinery to close it out immediately for what it will bring, and stock the works with the newest and most approved kinds. There is to be a busy time shortly, and shops ill fitted for work will suffer —"the weakest must go to the wall."

WATER AS FUEL.

On Monday evening, May 15th, the Association for the Advancement of Science and Art held a meeting at Room 24, Cooper Institute, and after some formal business, the President, Dr. John H. Griscom, read a paper on Water as Fuel. It was by far the ablest and most intelligent argument yet presented in favor of Hagan's stove.

It will be remembered that this stove has a vessel of water suspended in the upper portion, and as the water is evaporated the steam is conveyed downward in a pipe to the fire-box, where it is superheated and then blown directly among the burning coals. It is claimed that the steam is decomposed, giving up its oxygen to the coals, and that the hydrogen thus set free is then burned by the atmospheric air which enters through the grate, causing a great increase of heat.

The chemical changes may be illustrated by a few simple figures. The portion of anthracite coal that burns is carbon. Let a single atom of carbon be represented by a star (*) and let us follow it through the stove. Atmospheric air consists of one-fifth oxygen and four-fifths nitrogen gas, mechanically mingled. The nitrogen performs no part in combustion, the burning being the chemical combination of the oxygen with the carbon. Let an atom of oxygen be represented by a small o. When the air passes through the grate, two atoms of oxygen combined with one of carbon, o*o, to form an atom of carbonic acid—the heat of the fire being developed in this act of combination.

An atom of water is formed by the combination of one atom of oxygen with one of hydrogen. As the atom of hydrogen, though only one-eighth as heavy as the atom of oxygen, is twice as large, let that be represented by a large O, and the atom of the water by Oo.

Now, if a jet of superheated steam be thrown upon a bed of coals at a sufficiently intense heat, the steam will be decomposed, each atom of carbon combining with the two atoms of oxygen in two atoms of water, and setting free the two atoms of hydrogen.

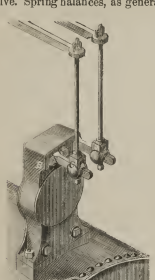
Then if the atoms of hydrogen thus set free are brought in contact with two atoms of the oxygen of the atmosphere, they enter into combination with them, forming again two atoms of water.

When coal is burned directly by the atmosphere, each atom of carbon, (*) combines with two atoms (oo) of the oxygen of the air, forming an atom (o*o) of carbonic acid. But if the atom of carbon takes

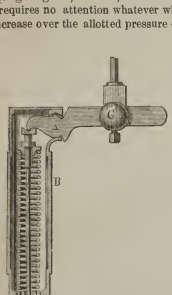
CAMERER'S SAFETY-VALVE BALANCE.

This simple and durably-constructed balance, illustrated in Figs. 1 and 2, was originally intended for locomotive engines, but can also, with great advantage, be used on marine engines, or any place where a dead weight is objectionable.

It is well known that a dead weight on a safety-valve lever is the most desirable and safest, wherever it can be applied; but on locomotive boilers, which rest on springs, it cannot be used, as its action on the valve would be influenced by the vibrations continually occurring. On marine boilers, where weights are still in use, the rolling of the ship occasionally makes it necessary to lash the levers down until the weather moderates, thereby destroying the only virtue of the valve. Spring balances, as generally made,



are more or less objectionable, on account of the springs becoming stiffer as the valve rises. Various plans have been adopted to overcome the defect by regulating the strength of the springs, thereby depending on the vigilance of the engineer to prevent the pressure from getting too great; whereas, the balance here illustrated, requires no attention whatever when in use, as an increase over the allotted pressure cannot take place.



The arms, A A, can rise as much as the safety valves may require, without additional pressure, which makes this balance equal in efficiency to a dead weight. An example will make the disadvantages of spring balances now in use more apparent. For instance, if a safety-valve lever is held down by a spring, the other end of which is fastened to the boiler or some other fixed point, the lever cannot rise without increase of power over and above the pressure it was calculated for; and if the proportions for length of lever are as 1 to 10, then the valve cannot be lifted one-eighth of an inch without raising the end of the lever ten times one-eighth, or 1¼ inches—which distance is, on the ordinary spring balance, equal to 28 lbs.; and ten times 28, or 280 lbs., on the valve. Now, if we have a valve of 2½ inches diameter, or 4·9 square inches area, the additional pressure would be 57 lbs. per square inch to lift said valve only one-eighth of an inch off its seat. Under such circumstances it ceases to be reliable, and requires watching and regulating to avoid over-pressure or accident.

The advantages of this improved balance are in the peculiar lever arrangement, by which the above enumerated faults are avoided. The arms of the levers, A, inside of the casting, B (see Fig. 1), from the fulcrum to the springs, are at an angle with the outside arms; and an upward movement of these outside arms is accompanied by a corresponding downward, and also an inward movement, of the inside arms resting on the springs; therefore, the more the springs are compressed the shorter the effective length of the inside arms will be, thereby increasing the power of the outside arms in the same proportion as the springs get stiffer from compression, thus enabling them to rise the required distance without increase of power. The rod, C, is fastened by a set screw to any distance from the fulcrum, according to the pressure required. Close behind this rod a small pin can be put through the arm, to prevent the engineer from increasing the pressure beyond what the boiler was intended to carry; but as much of the arms as is not in the way of anything, may be allowed to protrude, for the purpose of decreasing the pressure, should any accident to the boiler make it desirable to do so. To keep up a uniform pressure of steam is considered far less injurious to a boiler than the sudden changes, produced by slacking or screwing down safety-valve levers. Such changes will not take place where the improved balance is used.

The springs are made of hard brass wire, expressly drawn for these balances, and are not liable to corrosion, as is the case with steel springs; and, being compressed when working, are far less liable to break or to lose their elasticity.

These balances have been in use for more than a year on several of our leading railroads, where they give entire satisfaction. Patented March 1, 1864. For further particulars address the inventor, Wm. Camerer, Reading Pa.

NEW FORM FOR COINS.

We have seen a sample of a new plan for coins, which consists in making them in the form of the numeral of the denomination which they represent. For example, the one, two, three, four and five-cent coins have the form, respectively, of the numerals

1, 2, 3, 4, 5.

This novel style for coins presents a handsome appearance, and as each piece has its own distinctive form, no confusion in the use can take place. This is more than can be said of the new three-cent coins now being issued by the Government, which are so much like the one-cent pieces that after a short time it is difficult to perceive the difference.

Preservation of Flowers with their Natural Colors.

Dried flowers, in their natural colors, have, for some time past, appeared for sale in the shops. The mode in which the operation is effected is this:—A vessel, with a movable cover, is provided, and, having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken sufficient to fill the vessel, and passed through a sieve into an iron pot, where it is heated with the addition of a small quantity of stearin, carefully stirred, so as to thoroughly mix the ingredients. The quantity of stearin to be added is at the rate of half a pound to one hundred pounds of sand. Care must be taken not to add too much, as it would sink to the bottom and injure the flowers. The flowers thus become dried, and they retain their color perfectly.

Patent Pin.

The Union Pin Company of Boston, are now extensively manufacturing Tower's patent pins. The improvement consists in making a couple of nicks or indentations on the pin, which cause it to hold more firmly when the pin is inserted in any cloth or fabric. In other respects these pins are similar to those in common use. The improvement finds general favor.

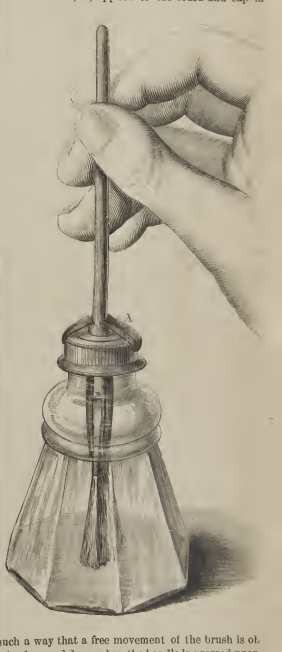
Librarian of the Patent Office.

Prof. W. E. Jillson leaves his position as Librarian o. ..atent Office to take that of Assistant Superintendent of the Boston Public Library. He has given general satisfaction in the position from which he is retiring, and his attainments as a linguist and bibliophilist, and his invariable courtesy, make his resignation a loss to the department. He is succeeded by Dr. George C. Schaeffer, who was formerly an Examiner in the Office.

BOSWELL'S MUCILAGE BOTTLE.

Persons who have occasion to use mucilage must have been annoyed by the inconvenient brush as generally made. When the bottle is nearly full, the brush becomes overcharged with the liquid, so that a greater quantity than is necessary is smeared on the paper. The handle of the common brush screws through the cap so as to lengthen or shorten it; but this is of no benefit so far as overloading the brush is concerned.

The engraving published herewith shows a neat device for keeping the brush out of the mucilage, or allowing it to be inserted to a greater or less depth, as desired. The attachment consists of an elastic band of rubber, A, applied to the brush and cap in



such a way that a free movement of the brush is obtained up and down when the handle is pressed upon. So soon, however, as the hold is relaxed, the brush remains at the top of the bottle out of the mucilage entirely.

This is a very neat little affair, and one that will render the use of such things much more agreeable.

It was patented through the Scientific American Patent Agency on August 1, 1865, by E. H. Boswell. For State rights to manufacture, apply to him, at south-east corner of Walnut and Eighth streets, Philadelphia, Pa.

A Novel English Invention.—The last number of the London *Artizan* has an illustration of an air engine, which it calls Messer's air engine. It is precisely the same in principle, and very closely similar in all its details, to the air engine invented by S. H. Roper, of Boston, Mass., which was fully illustrated in this paper on the 14th of February, 1863.

THE WAY BANKS ARE MANAGED IN NEW YORK.

To persons who have nothing to do with banks except to receive and pay away their bills, it naturally seems that furnishing these bills for use as money is the principal function of banks; it is in fact an incidental and comparatively unimportant part of their operations. Banks are companies of money lenders, who associate for the purpose of getting larger revenues from their capital, and with greater safety, than they could if each loaned his funds separately on his own account. The principal advantage of the association is the better credit obtained with the community by the large amount of paid-up capital, and the publicity which is given in relation to the bank's condition. This credit is advantageous in two ways.

First, it enables the bank to get the use of a large amount of capital without paying anything for its use. In every civilized community there are at all times persons having money on hand which they wish to deposit temporarily in some safe place where they may be sure to find it when they want it. Banks offer to receive such funds, and to return them promptly when called for; their whole capital being, of course, a pledge for the safety of the trust. Though each one of these deposits is liable to be called for at any moment, experience shows that others are constantly coming in, and thus a certain average amount, subject to some fluctuation, may be counted on with great confidence. A portion of this amount the bank officers consider it safe to loan to business men on good security, keeping sufficient funds on hand to meet any call of depositors likely to take place. The interest on this property of other people is, of course, a clear profit to the bank.

A second, but less important advantage of a good credit to the bank is the ability to pay out its notes and havethem circulated in the community as money. As these notes draw no interest, while they are given in exchange for the notes of business men drawing interest, they are, of course, a source of profit.

Our joint-stock banks are all under the management of Boards of Directors—men selected from among the largest stockholders—those, therefore, who are most interested in managing the bank with profit to the owners. The directors choose a President from among their number, and hire a cashier and the necessary clerks; they then offer to merchants and other business men to open accounts with them, to receive their surplus funds on deposit, and to loan them a limited amount of capital. In paying large sums it is safer and more convenient to make the payment by a check on a bank than to count the bills; every man in active business, therefore, keeps an account in some bank, depositing with it all the money he receives, and making his payments by checks, which are simply orders to the bank to pay the amount stated in the check.

Banks in New York are opened at 10 o'clock, A. M., and closed at 3 P. M. Merchants having accounts with a bank generally make a deposit in the afternoon, as near as may be before the closing hour, of all the funds they may have received during the day. These are partly in bank bills, but mostly in checks, and they are sent to the bank by a trusty clerk. A list of the checks is sent with the funds, together with a little blank book, in which the receiving teller enters the amount of the deposit; this entry being the bank's official receipt for the funds. The receiving teller compares the checks with the list, counts the money, if there is any, and enters the amount in the little book, and also in a large account book in the bank. This work is done with great rapidity, as in the afternoon there is usually a long line of clerks awaiting their turn at his window.

To avoid the inconvenience both to the bank and the merchant of having several deposits made in a day, it is customary for the merchant to draw checks for whatever payment he has to make during the day, even if he has not sufficient funds in the bank at the moment to meet them; and the bank pays these checks, trusting to the honor of the merchant to deposit sufficient funds to make all his checks good before the bank closes. Occasionally a customer fails to make his checks good, and the bank suffers a loss from its misplaced confidence; but a conclusive proof of the general prevalence of mercantile honor is furnished in the fact that losses from this source are of very rare occurrence.

Twice a week the directors meet to loan the funds on hand at the time. Loans are usually made by discounting notes. A commission merchant, for instance, has notes of different jobbers to the amount of $20,000, payable two or three months in the future, and he wants the money for them now. He writes his name on the back of each, and sends them to the bank for discount. The directors examine the notes, and if the names are satisfactory and they have the funds to loan, the paper is discounted; the bookkeeper computes the interest on the several notes to the time they are due, deducts it from the principal, and carries the amount remaining to the credit of the merchant.

When capital in market is not worth more than seven per cent the main question in regard to discounting any paper offered is the certainty of its being paid, but when capital is worth more than the legal rate, a second question has quite as much influence in deciding who among the several applicants for loans shall have the preference—that question is, who keeps the largest deposit with the bank. If two merchants want each $20,000, and, on examining the books, it is found that one has an average deposit of $5,000, and the other of $10,000, loaning the $20,000 to the former is equivalent to loaning $15,000, while to the latter it is equivalent to loaning $10,000, receiving in either case the interest on $20,000. In one case the interest on the capital actually furnished is 9¼ per cent; in the other it is 14 per cent. Bank directors, like other men, generally accept the best offer, and the man who keeps the best account gets the discount. In this way bank directors always manage to get the market rate of interest for their capital, in spite of any usury laws, however cunningly devised, that any legislators can enact.

NITRO-GLYCERIN.

The last number of *Le Genie Industriel* has an artical by M. Alt. Nobel, engineer, setting forth, at length, the advantages of nitro-glycerin over gunpowder for blasting rocks. The economy claimed is in the cost of drilling the rocks, as much smaller holes suffice, owing to the greater explosive force of nitro-glycerin. M. Nobel says that this force is in hard rocks from eight to ten times that of ordinary blasting powder, and in soft rocks from twenty to thirty times.

"Four principal causes contribute to its superior explosive force:—1st, its great specific gravity, which permits the introduction into a hole of nearly double the weight of powder which the same hole will receive; 2d, its perfect gasification, leaving no solid residue; 3d, its richness in oxygen, which produces com-plete combustion; 4th, its extraordinary suddenness of explosion.

"According to Regnault, gunpowder, in burning, forms, theoretically, 260 times its volume of gas, taken cold, but in practice, owing to incomplete combustion, it does not exceed 200 volumes. The formula of nitro-glycerin is—

$$C^6H^7O^2+5NO_3$$

which in burning would give—

$$6CO_2+5HO+5N+O$$

So that one volume of nitro-glycerin would produce about—

544 volumes of the vapor of water.
469 volumes of carbonic acid.
39 volumes of oxygen.
236 volumes of nitrogen.

1,288 volumes, taken cold."

[We give M. Nobel's formula but do not understand how he gets his NO_3. The formula of glycerin is $C_3H_4O_2,HO$, and the usual view of nitro-glycerin is that it is a substitution compound in which two atoms of hydrogen are replaced by two atoms of nitrous acid, making the formula of nitro-glycerin—

$$C_3H_2(2NO_2)O_2]$$

"It is evident that gunpowder, the combustion of which is very incomplete, cannot produce an elevation of temperature so great as nitro-glycerin, of which all the carbon is transformed into carbonic acid, and all the hydrogen into water. This is proved in practice by the fact that a small addition of nitro-glycerin to powder communicates much more brilliancy to the flame. It is difficult to measure the heat of an explosive substance, but, in view of the above-mentioned circumstance, it will be admitted that the temperature of the flame ought to be nearly double that of gunpowder. We shall have then for powder 200 volumes, which, with a quadruple expansion, will be 800 volumes, and for nitro-glycerin 1,288—in round numbers 1,300 volumes—which, with an equal expansion, will be 10,400."

Nitro-glycerin is made by dropping glycerin into a mixture of equal parts of strong nitric and sulphuric acids. It is a heavy oily liquid, its specific gravity being 1·6. It is insoluble in water, and the usual plan is to fill the hole above it with water in place of tamping, and then to fire it with a safety fuse, having a heavily charged percussion cap at its lower end. This mode of firing has been patented in France and other countries.

According to M. Nobel, nitro-glycerin does not explode by direct fire, decomposing itself with flame by contact with an ignited body, but being extinguished so soon as the bot body is removed. He also says that it detonates under a violent blow of a hammer, but only the part that is struck explodes; the fire is not propagated to the surrounding portions. A few drops spread on an anvil may, by repeated blows, produce a series of explosions. By the gradual application of heat it explodes at 180° Cent.—356° Fah. It is a very permanent compound, preserving itself indefinitely, and not being decomposed by either phosphorous or potassium.

THE ELECTRIC RAY OF THE ENGLISH CHANNEL, AND OTHER ELECTRIC FISH.

[Translated from the French for the Scientific American.]

In a paper communicated recently to the French Academy of Sciences, by Mr. Charles Robin, occur the following statements regarding certain electric fish:—

"The varieties of these fish are but few in number; the *raya*, ray, or skate, the *gymnotus electricus*, or electric eel, and the *silurus electricus*. The *raya* belongs to the skate family, hence they are sometimes termed electric skates, while fishermen call them *tremblers*, or magic fish. This fish has a smooth, flat body and short tail, resembling somewhat an almost circular disk. There are several kinds to be found on the coasts of Provence, and the channel between France and England. If a ray be taken up in the hand a strong shock will at once be felt, so violent as to benumb and even paralyze the entire arm during several minutes. The sensation may be compared to that experienced from a violent blow on the elbow. The force of the shock is estimated as equal to that of a pile of 100 to 150 pairs charged with salt water. The discharges succeed each other with very great rapidity, as many as fifty discharges having been counted in one minute. A shock can be given to twenty persons simultaneously, if they stand touching each other in a circle, with the two persons at each end touching, the one the back and the other the belly of the ray. It has been discovered that the back of the fish emits positive and the belly negative electricity. After a fisherman has emptied the contents of his net into his boat, if he pours a large quantity of salt water upon the fish, should there be an electric ray among them, he is at once apprised of the fact by a shock in the hand he uses to pour out the water.

"Plutarch mentions this peculiarity as having been known to the ancients. The discharge from the ray emits sparks similar to those of an electric machine, produces magnetization and chemical decomposition, and gives marked signs of heat when passed through a thermo-electric pair.

"The electric organs are of three kinds, viz:—

"First, In the lower half of the body and at each side of the head there are several hundred small tubes (Hunter counted as many as 1,182) or membraneous, vertical prisms close together, like honeycombs, and subdivided by horizontal partitions into little cells filled with mucus.

"Second, In the hinder part of the brain there is a lobe known as the electric lobe. Every time that this lobe is touched strong discharges are produced, even if the organ be separated from the brain and spinal marrow. All action upon the body of the ray, determining the discharge, is transmitted by the nerves from the irritated spot to the electric lobe of the brain.

"Third, Three very large branches of the fourth pair